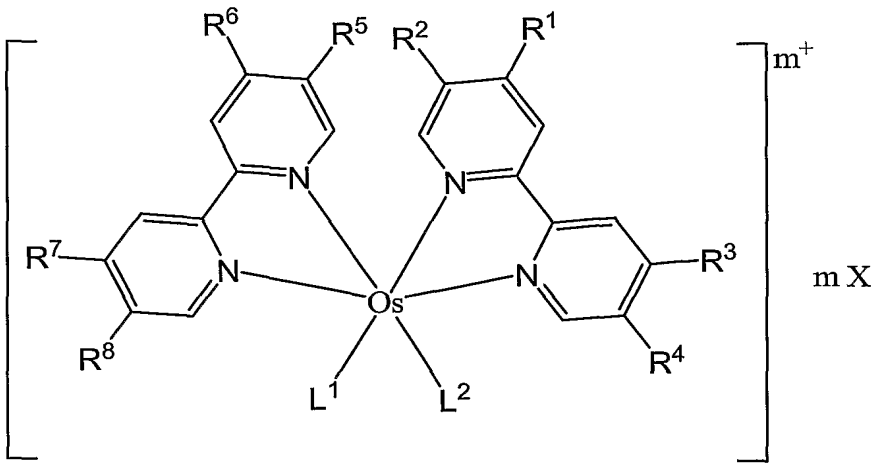
WHAT IS CLAIMED IS:

1. A compound of Formula I



I

wherein:

each L^1 is independently an organic molecule having:

(a) a 5-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with Os;

(b) a 6-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with Os;

(c) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with Os;

(d) an $-NH_2$ group whose nitrogen atom forms a bond with Os; or

(e) a –COOH group, one of whose oxygen atoms forms a bond with Os;

L^2 is $(R^2)_3P$, $(R^2O)_3P$, or L^1, wherein each R^2 is independently -C_1-C_{18} alkyl, -C_3-C_8 cycloalkyl, or phenyl, and m is 2; or L^2 is -CN and m is 1;

R^1-R^8 are independently –H, -C_1-C_{18} alkyl, $-NH_2$, -COOH, -(C_1-C_{18} alkyl)-O-(C_1-C_{18} alkyl), or –OC(O)(C_1-C_{18} alkyl); and

X is Cl^-, F^-, Br^-, I^-, PF_6^-, $CF_3SO_3^-$, (C_1-C_{18} alkyl)-CO_2^-, or (C_1-C_{18} alkyl)-SO_3^-.

2. The compound of claim 1, wherein the organic molecule is 4-aminopyridine.

3. The compound of claim 1, wherein the organic molecule is (RS)-(tetrazol-5-yl) glycine.

4. The compound of claim 1, wherein the organic molecule is (tetrazol-5-yl) AMPA.

5. The compound of claim 1, wherein the organic molecule is nicotine or caffeine.

6. The compound of claim 1, wherein the organic molecule is serotonin, epinephrine, norepinephrine, or dopamine.

7. The compound of claim 1, wherein the organic molecule is adenosine 5'-diphosphate ADP, adenosine 5'-triphosphate ATP, adenosine 5'-monophosphate AMP, cyclic adenosine 5'-diphosphate ribose, or adenosine 3', 5'-cyclicmonophosphate.

8. The compound of claim 1, wherein the organic molecule is aminobutyric acid or L-glutamic acid, or methyl-D-aspartic acid.

9. A method for releasing an organic molecule from a Photolabile Compound, comprising:
exposing a compound of claim 1 to light under conditions sufficient to release the organic molecule.

10. The method of claim 9, wherein the light comprises a wavelength of about 300 to about 500 nm.

11. The method of claim 10, wherein the light comprises a wavelength of about 300 to about 360 nm.

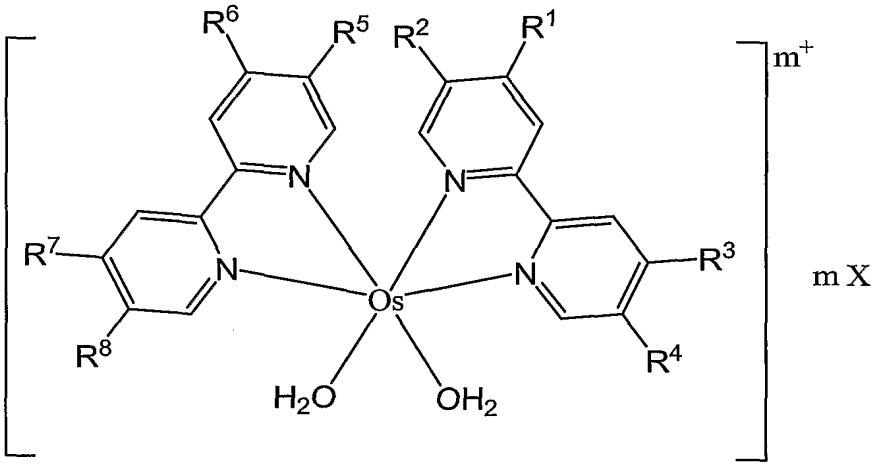
12. The method of claim 10, wherein the light comprises a wavelength of about 450 to about 500 nm.

13. The method of claim 9, wherein L^2 is L^1.

14. The method of claim 9, wherein the light comprises visible light or infrared light.

15. The method of claim 9, wherein the exposing occurs at a temperature from about 0°C to about 150°C.

16. A method for protecting an organic molecule from an effect of an enzyme, comprising:
allowing the organic molecule and a compound of Formula I':



I'

wherein m is 2; R^1-R^8 are independently –H, -C_1-C_{18} alkyl, -NH_2, -COOH, -(C_1-C_{18} alkyl)-O-(C_1-C_{18} alkyl), or –OC(O)(C_1-C_{18} alkyl); and X is Cl^-, F^-, Br^-, I^-, PF_6^-, $CF_3SO_3^-$, (C_1-C_{18} alkyl)-CO_2^-, or (C_1-C_{18} alkyl)-SO_3^-,
to react under conditions sufficient to make a compound of claim 1, wherein the organic molecule has:

(a) a 5-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with Os;

(b) a 6-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with Os;

(c) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with Os;

(d) an $-NH_2$ group whose nitrogen atom forms a bond with Os; or

(e) a –COOH group, one of whose oxygen atoms forms a bond with Os.

17. A method for making an organic molecule bioavailable to a subject, comprising:

(a) administering a compound of claim 1 to the subject; and

(b) exposing the compound to light under conditions sufficient to release the organic molecule from the compound, wherein the organic molecule has:

(i) a 5-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with Os;

(ii) a 6-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with Os;

(iii) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with Os;

(iv) an $-NH_2$ group whose nitrogen atom forms a bond with Os; or

(v) a –COOH group, one of whose oxygen atoms forms a bond with Os.

18. The method of claim 17, wherein the light is sunlight, photo-optic light, or laser light.

19. The method of claim 17, wherein the light is visible light or infrared light.

20. The method of claim 17, wherein the exposing occurs at the site of a tumor, cancer, or neoplasm.

21. The method of claim 17, wherein the administering occurs intravenously, topically, intradermally, intramuscularly, transdermally, subcutaneously, intranasally, parenterally, intrathecally, vaginally, rectally, colorectally, orally, intracranially, retroorbitally, intrasternally, or by injection.

22. The method of claim 17, wherein the administering is via a transdermal patch.

23. A composition comprising a compound of claim 1 and a physiologically acceptable carrier, vehicle, diluent, or excipient.

24. A vessel containing a compound of claim 1.

25. The vessel of claim 24, further containing a biological sample.

26. The vessel of claim 25, wherein the biological sample is an organ, tissue, cell, or hair sample.

27. The vessel of claim 26, wherein the tissue is neuronal tissue.

28. The vessel of claim 26, wherein the cell is a neuronal cell.

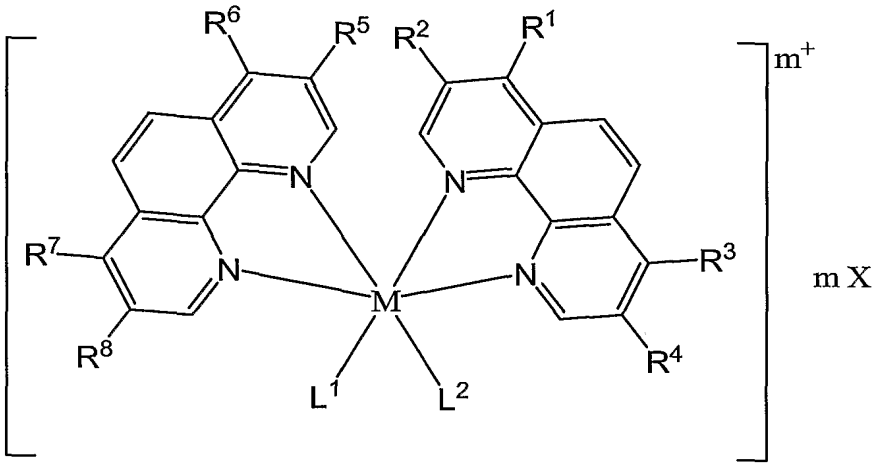
29. The vessel of claim 26, wherein the tissue or cell is a tumor, cancer, or neoplastic tissue or cell.

30. The vessel of claim 25, wherein the biological sample is a body fluid sample.

31. The vessel of claim 30, wherein the body fluid sample is blood, serum, plasma, lymph, saliva, sputum, tears, semen, or urine.

32. A kit comprising a compound of claim 1 and instructions for use of the compound.

33. A compound of Formula II:



II

wherein M is Ru or Os;

each L^1 is independently an organic molecule having:

(a) a 5-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with M;

(b) a 6-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with M;

(c) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with M;

(d) an $-NH_2$ group whose nitrogen atom forms a bond with M; or

(e) a –COOH group, one of whose oxygen atoms forms a bond with M;

L^2 is $(R^2)_3P$, $(R^2O)_3P$, or L^1, wherein each R^2 is independently -C_1-C_{18} alkyl, -C_3-C_8 cycloalkyl, or phenyl, and m is 2; or L^2 is -CN and m is 1;

R^1-R^8 are independently –H, -C_1-C_{18} alkyl, -NH_2, -COOH, -(C_1-C_{18} alkyl)-O-(C_1-C_{18} alkyl), or –OC(O)(C_1-C_{18} alkyl); and

X is Cl^-, F^-, Br^-, I^-, PF_6^-, $CF_3SO_3^-$, (C_1-C_{18} alkyl)-CO_2^-, or (C_1-C_{18} alkyl)-SO_3^-.

34. The compound of claim 33, wherein the organic molecule is 4-aminopyridine.

35. The compound of claim 33, wherein the organic molecule is (RS)-(tetrazol-5-yl) glycine.

36. The compound of claim 33, wherein the organic molecule is (tetrazol-5-yl) AMPA.

37. The compound of claim 33, wherein the organic molecule is nicotine or caffeine.

38. The compound of claim 33, wherein the organic molecule is serotonin, epinephrine, norepinephrine, or dopamine.

39. The compound of claim 33, wherein the organic molecule is adenosine 5'-diphosphate ADP, adenosine 5'-triphosphate ATP, adenosine 5'-monophosphate AMP, cyclic adenosine 5'-diphosphate ribose, or adenosine 3', 5'-cyclicmonophosphate.

40. The compound of claim 33, wherein the organic molecule is aminobutyric acid or L-glutamic acid, or methyl-D-aspartic acid.

41. A method for releasing an organic molecule from a Photolabile Compound, comprising:
exposing a compound of claim 33 to light under conditions sufficient to release the organic molecule.

42. The method of claim 41, wherein the light comprises a wavelength of about 300 to about 500 nm.

43. The method of claim 42, wherein the light comprises a wavelength of about 300 to about 360 nm.

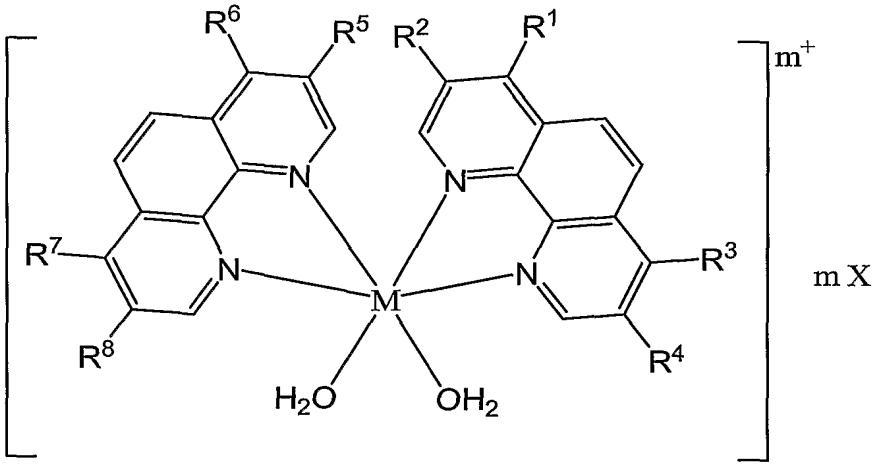
44. The method of claim 42, wherein the light comprises a wavelength of about 450 to about 500 nm.

45. The method of claim 41, wherein L^2 is L^1.

46. The method of claim 41, wherein the light comprises visible light or infrared light.

47. The method of claim 41, wherein the exposing occurs at a temperature from about 0°C to about 150°C.

48. A method for protecting an organic molecule from an effect of an enzyme, comprising:
allowing the organic molecule and a compound of Formula II':



II'

wherein m is 2, R^1-R^8 are independently –H, -C_1-C_{18} alkyl, -NH_2, -COOH, -(C_1-C_{18} alkyl)-O-(C_1-C_{18} alkyl), or –OC(O)(C_1-C_{18} alkyl); and X is Cl^-, F^-, Br^-, I^-, PF_6^-, $CF_3SO_3^-$, (C_1-C_{18} alkyl)-CO_2^-, or (C_1-C_{18} alkyl)-SO_3^-,
to react under conditions sufficient to make a compound of claim 33, wherein the organic molecule has:

(a) a 5-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with M;

(b) a 6-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with M;

(c) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with M;

(d) an $-NH_2$ group whose nitrogen atom forms a bond with M; or

(e) a –COOH group, one of whose oxygen atoms forms a bond with M.

49. A method for making an organic molecule bioavailable to a subject, comprising:

(a) administering a compound of claim 33 to the subject; and

(b) exposing the compound to light under conditions sufficient to release the organic molecule from the compound, wherein the organic molecule has:

(i) a 5-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with M;

(ii) a 6-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with M;

(iii) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with M;

(iv) an $-NH_2$ group whose nitrogen atom forms a bond with M; or

(v) a –COOH group, one of whose oxygen atoms forms a bond with M.

50. The method of claim 49, wherein the light is sunlight, photo-optic light, or laser light.

51. The method of claim 49, wherein the light is visible light or infrared light.

52. The method of claim 49, wherein the exposing occurs at the site of a tumor, cancer, or neoplasm.

53. The method of claim 49, wherein the administering occurs intravenously, topically, intradermally, intramuscularly, transdermally, subcutaneously, intranasally, parenterally, intrathecally, vaginally, rectally, colorectally, orally, intracranially, retroorbitally, intrasternally, or by injection.

54. The method of claim 49, wherein the administering is via a transdermal patch.

55. A composition comprising a compound of claim 33 and a physiologically acceptable carrier, vehicle, diluent, or excipient.

56. A vessel containing a compound of claim 33.

57. The vessel of claim 56, further containing a biological sample.

58. The vessel of claim 57, wherein the biological sample is an organ, tissue, cell, or hair sample.

59. The vessel of claim 58, wherein the tissue is neuronal tissue.

60. The vessel of claim 58, wherein the cell is a neuronal cell.

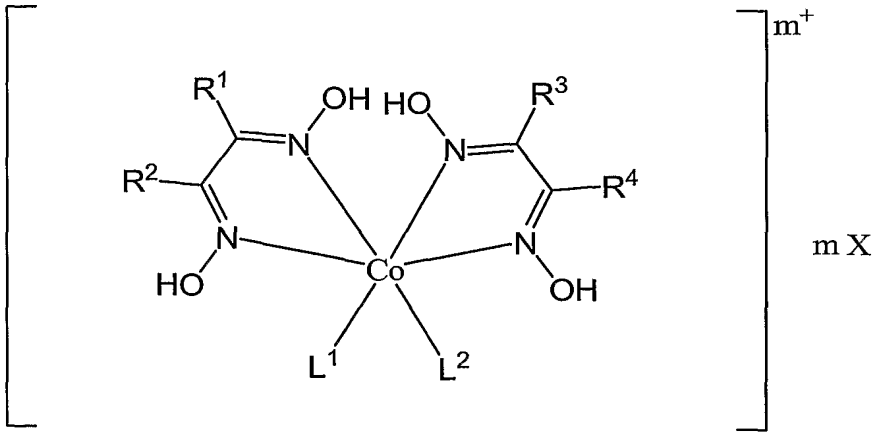
61. The vessel of claim 58, wherein the tissue or cell is a tumor, cancer, or neoplastic tissue or cell.

62. The vessel of claim 57, wherein the biological sample is a body fluid sample.

63. The vessel of claim 62, wherein the body fluid sample is blood, serum, plasma, lymph, saliva, sputum, tears, semen, or urine.

64. A kit comprising a compound of claim 33 and instructions for use of the compound.

65. A compound of Formula III:



III

wherein:

each L^1 is independently an organic molecule having:

(a) a 5-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with Co;

(b) a 6-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with Co;

(c) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with Co;

(d) an $-NH_2$ group whose nitrogen atom forms a bond with Co; or

(e) a –COOH group, one of whose oxygen atoms forms a bond with Co;

L^2 is $(R^2)_3P$, $(R^2O)_3P$, or L^1, wherein each R^2 is independently -C_1-C_{18} alkyl, -C_3-C_8 cycloalkyl, or phenyl, and m is 3; or L^2 is –CN, -Cl, Br, -I or $-N_3$ and m is 2;

R^1 to R^4 are independently -C_1-C_{18} alkyl; and

X is Cl^-, F^-, Br^-, I^-, PF_6^-, $CF_3SO_3^-$, (C_1-C_{18} alkyl)-CO_2^-, or (C_1-C_{18} alkyl)-SO_3^-.

66. The compound of claim 65, wherein the organic molecule is 4-aminopyridine.

67. The compound of claim 65, wherein the organic molecule is (RS)-(tetrazol-5-yl) glycine.

68. The compound of claim 65, wherein the organic molecule is (tetrazol-5-yl) AMPA.

69. The compound of claim 65, wherein the organic molecule is nicotine or caffeine.

70. The compound of claim 65, wherein the organic molecule is serotonin (5-hydroxy triptamine), epinephrine, norepinephrine, or dopamine.

71. The compound of claim 65, wherein the organic molecule is adenosine 5'-diphosphate ADP, adenosine 5'-triphosphate ATP, adenosine 5'-monophosphate AMP, cyclic adenosine 5'-diphosphate ribose, or adenosine 3', 5'-cyclicmonophosphate.

72. The compound of claim 65, wherein the organic molecule is aminobutyric acid or L-glutamic acid, or methyl-D-aspartic acid.

73. A method for releasing an organic molecule from a Photolabile Compound, comprising:
exposing a compound of claim 65 to light under conditions sufficient to release the organic molecule.

74. The method of claim 73, wherein the light comprises a wavelength of about 300 to about 500 nm.

75. The method of claim 74, wherein the light comprises a wavelength of about 300 to about 360 nm.

76. The method of claim 74, wherein the light comprises a wavelength of about 450 to about 500 nm.

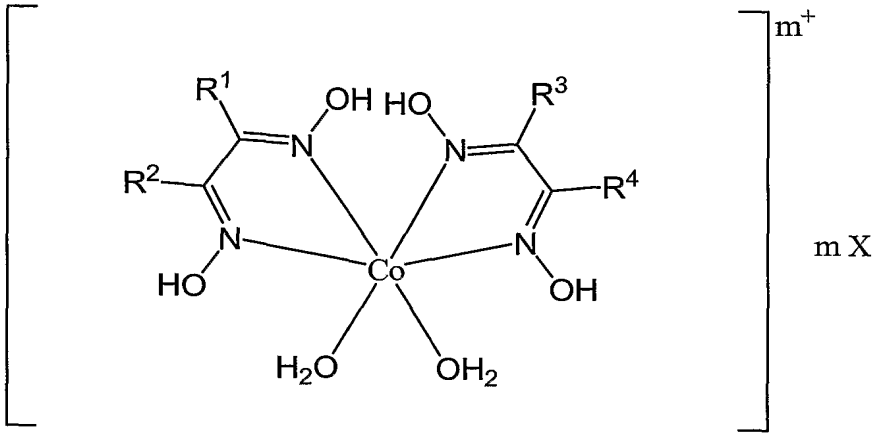
77. The method of claim 73, wherein L^2 is L^1.

78. The method of claim 73, wherein the light comprises visible light or infrared light.

79. The method of claim 73, wherein the exposing occurs at a temperature from about 0°C to about 150°C.

80. A method for protecting an organic molecule from an effect of an enzyme, comprising:

allowing the organic molecule and a compound of Formula III':



III'

wherein m is 3, R^1 to R^4 are independently -C_1-C_{18} alkyl; and X is Cl^-, F^-, Br^-, I^-, PF_6^-, $CF_3SO_3^-$, (C_1-C_{18} alkyl)-CO_2^-, or (C_1-C_{18} alkyl)-SO_3^-,

to react under conditions sufficient to make a compound of claim 65, wherein the organic molecule has:

(a) a 5-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with Co;

(b) a 6-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with Co;

(c) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with Co;

(d) an $-NH_2$ group whose nitrogen atom forms a bond with Co; or

(e) a –COOH group, one of whose oxygen atoms forms a bond with Co.

81. A method for making an organic molecule bioavailable to a subject, comprising:

(a) administering a compound of claim 65 to the subject; and

(b) exposing the compound to light under conditions sufficient to release the organic molecule from the compound, wherein the organic molecule has:

(i) a 5-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with Co;

(ii) a 6-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with Co;

(iii) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with Co;

(iv) an $-NH_2$ group whose nitrogen atom forms a bond with Co; or

(v) a –COOH group, one of whose oxygen atoms forms a bond with Co.

82. The method of claim 81, wherein the light is sunlight, photo-optic light, or laser light.

83. The method of claim 81, wherein the light is visible light or infrared light.

84. The method of claim 81, wherein the exposing occurs at the site of a tumor, cancer, or neoplasm.

85. The method of claim 81, wherein the administering occurs intravenously, topically, intradermally, intramuscularly, transdermally, subcutaneously, intranasally, parenterally, intrathecally, vaginally, rectally, colorectally, orally, intracranially, retroorbitally, intrasternally, or by injection.

86. The method of claim 81, wherein the administering is via a transdermal patch.

87. A composition comprising a compound of claim 65 and a physiologically acceptable carrier, vehicle, diluent, or excipient.

88. A vessel containing a compound of claim 65.

89. The vessel of claim 88, further containing a biological sample.

90. The vessel of claim 89, wherein the biological sample is an organ, tissue, cell, or hair sample.

91. The vessel of claim 90, wherein the tissue is neuronal tissue.

92. The vessel of claim 90, wherein the cell is a neuronal cell.

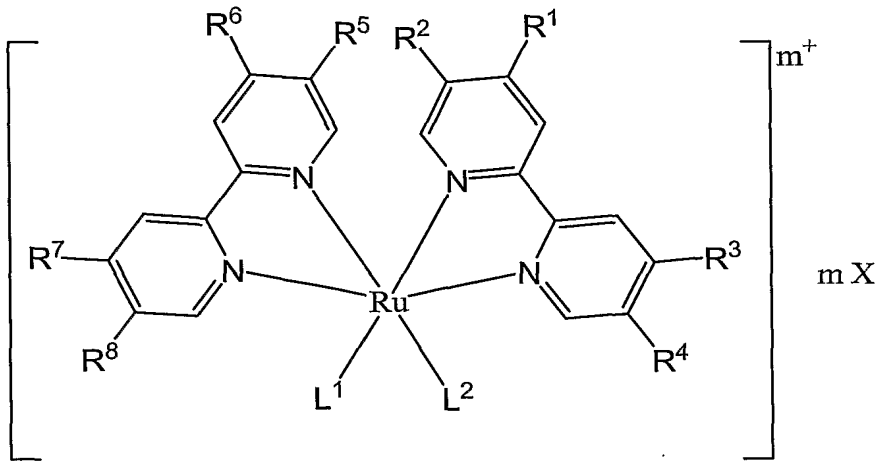
93. The vessel of claim 90, wherein the tissue or cell is a tumor, cancer, or neoplastic tissue or cell.

94. The vessel of claim 89, wherein the biological sample is a body fluid sample.

95. The vessel of claim 94, wherein the body fluid sample is blood, serum, plasma, lymph, saliva, sputum, tears, semen, or urine.

96. A kit comprising a compound of claim 65 and instructions for use of the compound.

97. A compound of Formula IVa:



IVa

wherein:

each L^1 is independently an organic molecule having:

(a) a tetrazolyl group, one of its nitrogen atoms forming a bond with Ru;

(b) nicotine or caffeine, whose pyridyl nitrogen atom forms a bond with Ru;

(c) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with Ru;

(d) an $-NH_2$ group whose nitrogen atom forms a bond with Ru; or

(e) a –COOH group, one of whose oxygen atoms forms a bond with Ru;

L^2 is $(R^2)_3P$, $(R^2O)_3P$, or L^1, wherein each R^2 is independently -C_1-C_{18} alkyl, -C_3-C_8 cycloalkyl, or phenyl, and m is 2; or L^2 is –CN and m is 1;

R^1 to R^8 are independently –H, -C_1-C_{18} alkyl; $-NH_2$, -COOH, -(C_1-C_{18} alkyl)-O-(C_1-C_{18} alkyl), or –OC(O)(C_1-C_{18} alkyl); and

X is Cl^-, F^-, Br^-, I^-, PF_6^-, $CF_3SO_3^-$, (C_1-C_{18} alkyl)-CO_2^-, or (C_1-C_{18} alkyl)-SO_3^-.

98. The compound of claim 97, wherein the organic molecule is (RS)-(tetrazol-5-yl) glycine.

99. The compound of claim 97, wherein the organic molecule is (tetrazol-5-yl) AMPA.

100. The compound of claim 97, wherein the organic molecule is nicotine or caffeine.

101. The compound of claim 97, wherein the organic molecule is serotonin, epinephrine, norepinephrine, or dopamine.

102. The compound of claim 97, wherein the organic molecule is adenosine 5'-diphosphate ADP, adenosine 5'-triphosphate ATP, adenosine 5'-monophosphate AMP, cyclic adenosine 5'-diphosphate ribose, or adenosine 3', 5'-cyclicmonophosphate.

103. The compound of claim 97, wherein the organic molecule is aminobutyric acid or L-glutamic acid, or methyl-D-aspartic acid.

104. A method for releasing an organic molecule from a Photolabile Compound, comprising:
exposing a compound of claim 97 to light under conditions sufficient to release the organic molecule.

105. The method of claim 104, wherein the light comprises a wavelength of about 300 to about 500 nm.

106. The method of claim 105, wherein the light comprises a wavelength of about 300 to about 360 nm.

107. The method of claim 105, wherein the light comprises a wavelength of about 450 to about 500 nm.

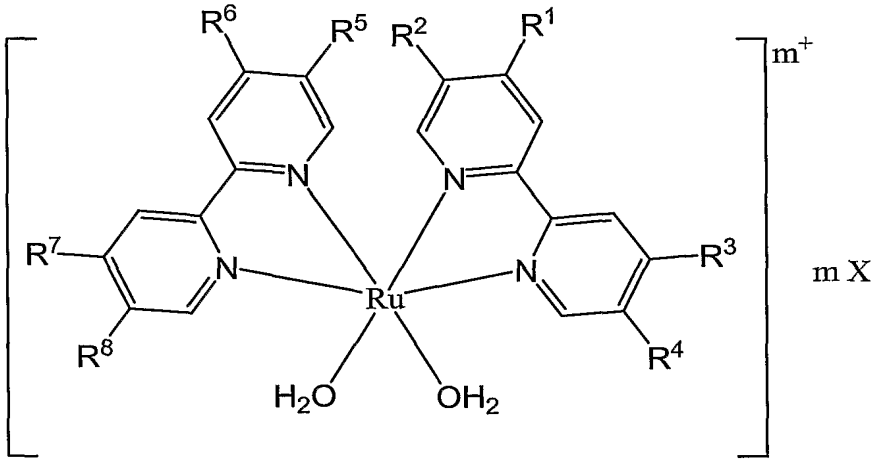
108. The method of claim 105, wherein L^2 is L^1.

109. The method of claim 105, wherein the light comprises visible light or infrared light.

110. The method of claim 105, wherein the exposing occurs at a temperature from about 0°C to about 150°C.

111. A method for protecting an organic molecule from an effect of an enzyme, comprising:

allowing the organic molecule and a compound of Formula IVa':



IVa'

wherein m is 2; R^1 to R^8 are independently –H, -C_1-C_{18} alkyl; -NH_2, -COOH, -(C_1-C_{18} alkyl)-O-(C_1-C_{18} alkyl), or –OC(O)(C_1-C_{18} alkyl); and X is Cl^-, F^-, Br^-, I^-, PF_6^-, $CF_3SO_3^-$, (C_1-C_{18} alkyl)-CO_2^-, or (C_1-C_{18} alkyl)-SO_3^-,

to react under conditions sufficient to make a compound of claim 97, wherein the organic molecule has:

(a) a tetrazolyl group, one of its nitrogen atoms forming a bond with Ru;

(b) nicotine or caffeine, whose pyridyl nitrogen atom forms a bond with Ru;

(c) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with Ru;

(d) an –NH_2 group whose nitrogen atom forms a bond with Ru; or

(e) a –COOH group, one of whose oxygen atoms forms a bond with Ru.

112. A method for making an organic molecule bioavailable to a subject, comprising:

(a) administering a compound of claim 97 to the subject; and

(b) exposing the compound to light under conditions sufficient to release the organic molecule from the compound, wherein the organic molecule has:

(i) a tetrazolyl group, one of its nitrogen atoms forming a bond with Ru

(ii) nicotine or caffeine, whose pyridyl nitrogen atom forms a bond with Ru;

(iii) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with Ru;

(iv) an $-NH_2$ group whose nitrogen atom forms a bond with Ru; or

(v) a –COOH group, one of whose oxygen atoms forms a bond with Ru.

113. The method of claim 112, wherein the light is sunlight, photo-optic light, or laser light.

114. The method of claim 112, wherein the light is visible light or infrared light.

115. The method of claim 112, wherein the exposing occurs at the site of a tumor, cancer, or neoplasm.

116. The method of claim 112, wherein the administering occurs intravenously, topically, intradermally, intramuscularly, transdermally, subcutaneously, intranasally, parenterally, intrathecally, vaginally, rectally, colorectally, orally, intracranially, retroorbitally, intrasternally, or by injection.

117. The method of claim 112, wherein the administering is via a transdermal patch.

118. A composition comprising a compound of claim 97 and a physiologically acceptable carrier, vehicle, diluent, or excipient.

119. A vessel containing a compound of claim 97.

120. The vessel of claim 119, further containing a biological sample.

121. The vessel of claim 120, wherein the biological sample is an organ, tissue, cell, or hair sample.

122. The vessel of claim 121, wherein the tissue is neuronal tissue.

123. The vessel of claim 121, wherein the cell is a neuronal cell.

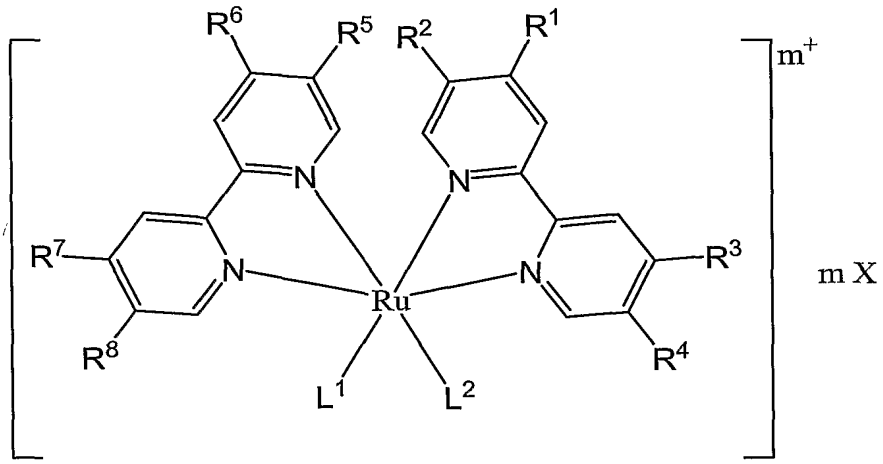
124. The vessel of claim 121, wherein the tissue or cell is a tumor, cancer, or neoplastic tissue or cell.

125. The vessel of claim 120, wherein the biological sample is a body fluid sample.

126. The vessel of claim 125, wherein the body fluid sample is blood, serum, plasma, lymph, saliva, sputum, tears, semen, or urine.

127. A kit comprising a compound of claim 97 and instructions for use of the compound.

128. A compound of Formula IVb:



IVb

wherein:

L^1 is 4-aminopyridine, whose pyridyl nitrogen atom forms a bond with Ru;

L^2 is $(R^2)_3P$, $(R^2O)_3P$, or L^1, wherein each R^2 is independently -C_1-C_{18} alkyl, -C_3-C_8 cycloalkyl, or phenyl, and m is 2; or L^2 is –CN and m is 1;

R^1 to R^8 are independently –H, -C_1-C_{18} alkyl, -NH_2, -COOH, -(C_1-C_{18} alkyl)-O-(C_1-C_{18} alkyl), or –OC(O)(C_1-C_{18} alkyl); and

X is Cl^-, F^-, Br^-, I^-, PF_6^-, $CF_3SO_3^-$, (C_1-C_{18} alkyl)-CO_2^-, or (C_1-C_{18} alkyl)-SO_3^-.

129. A method for releasing an organic molecule from a Photolabile Compound, comprising:

exposing a compound of claim 128 to light under conditions sufficient to release the organic molecule.

130. The method of claim 129, wherein the light comprises a wavelength of about 300 to about 500 nm.

131. The method of claim 130, wherein the light comprises a wavelength of about 300 to about 360 nm.

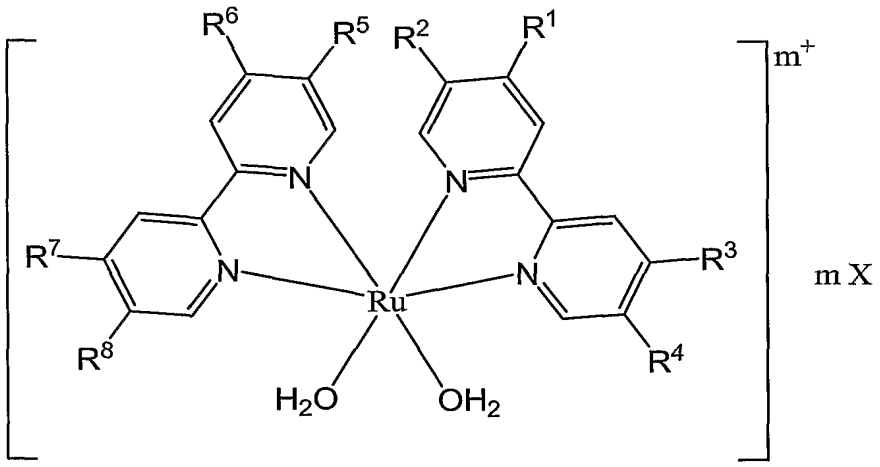
132. The method of claim 130, wherein the light comprises a wavelength of about 450 to about 500 nm.

133. The method of claim 128, wherein L^2 is L^1.

134. The method of claim 128, wherein the light comprises visible light or infrared light.

135. The method of claim 128, wherein the exposing occurs at a temperature from about 0°C to about 150°C.

136. A method for protecting an organic molecule from an effect of an enzyme, comprising:
allowing the organic molecule and a compound of Formula IVb':



IVb'

wherein m is 2; R^1 to R^8 are independently –H, -C_1-C_{18} alkyl; -NH_2, -COOH, -(C_1-C_{18} alkyl)-O-(C_1-C_{18} alkyl), or –OC(O)(C_1-C_{18} alkyl); and X is Cl^-, F^-, Br^-, I^-, PF_6^-, $CF_3SO_3^-$, (C_1-C_{18} alkyl)-CO_2^-, or (C_1-C_{18} alkyl)-SO_3^-,
to react under conditions sufficient to make a compound of claim 129, wherein the organic molecule 4-aminopyridine, whose pyridyl nitrogen atom forms a bond with Ru.

137. A method for making an organic molecule bioavailable to a subject, comprising:

(a) administering a compound of claim 128 to the subject; and

(b) exposing the compound to light under conditions sufficient to release the organic molecule from the compound, wherein the organic molecule is molecule 4-aminopyridine (4-AP), whose pyridyl nitrogen atom forms a bond with Ru.

138. The method of claim 137, wherein the light is sunlight, photo-optic light, or laser light.

139. The method of claim 137, wherein the light is visible light or infrared light.

140. The method of claim 137, wherein the exposing occurs at the site of a tumor, cancer, or neoplasm.

141. The method of claim 137, wherein the administering occurs intravenously, topically, intradermally, intramuscularly, transdermally, subcutaneously, intranasally, parenterally, intrathecally, vaginally, rectally, colorectally, orally, intracranially, retroorbitally, intrasternally, or by injection.

142. The method of claim 137, wherein the administering is via a transdermal patch.

143. A composition comprising a compound of claim 128 and a physiologically acceptable carrier, vehicle, diluent, or excipient.

144. A vessel containing a compound of claim 128.

145. The vessel of claim 144, further containing a biological sample.

146. The vessel of claim 145, wherein the biological sample is an organ, tissue, cell, or hair sample.

147. The vessel of claim 146, wherein the tissue is neuronal tissue.

148. The vessel of claim 146, wherein the cell is a neuronal cell.

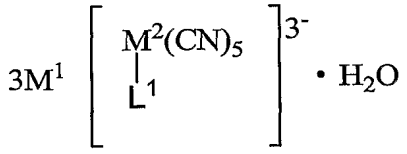
149. The vessel of claim 146, wherein the tissue or cell is a tumor, cancer, or neoplastic tissue or cell.

150. The vessel of claim 145, wherein the biological sample is a body fluid sample.

151. The vessel of claim 150, wherein the body fluid sample is blood, serum, plasma, lymph, saliva, sputum, tears, semen, or urine.

152. A kit comprising a compound of claim 128 and instructions for use of the compound.

153. A compound of Formula V:



V

wherein M^1 is Li^+, Na^+, or K^+; and M^2 is Fe, Ru, or Os; and

L^1 is independently an organic molecule having:

(a) a 5-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with M^2;

(b) a 6-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with M^2;

(c) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with M^2;

(d) an $-NH_2$ group whose nitrogen atom forms a bond with M^2; or

(e) a –COOH group, one of whose oxygen atoms forms a bond with M^2; and

X is Cl^-, F^-, Br^-, I^-, PF_6^-, $CF_3SO_3^-$, $(C_1\text{-}C_{18}$ alkyl)-CO_2^-, or $(C_1\text{-}C_{18}$ alkyl)-SO_3^-.

154. The compound of claim 153, wherein the organic molecule is 4-aminopyridine.

155. The compound of claim 153, wherein the organic molecule is (RS)-(tetrazol-5-yl) glycine.

156. The compound of claim 153, wherein the organic molecule is (tetrazol-5-yl) AMPA.

157. The compound of claim 153, wherein the organic molecule is nicotine or caffeine.

158. The compound of claim 153, wherein the organic molecule is serotonin (5-hydroxy triptamine), epinephrine, norepinephrine, or dopamine.

159. The compound of claim 153, wherein the organic molecule is adenosine 5'-diphosphate ADP, adenosine 5'-triphosphate ATP, adenosine 5'-monophosphate AMP, cyclic adenosine 5'-diphosphate ribose, or adenosine 3', 5'-cyclicmonophosphate.

160. The compound of claim 153, wherein the organic molecule is aminobutyric acid or L-glutamic acid, or methyl-D-aspartic acid.

161. A method for releasing an organic molecule from a Photolabile Compound, comprising:

exposing a compound of claim 153 to light under conditions sufficient to release the organic molecule.

162. The method of claim 161, wherein the light comprises a wavelength of about 300 to about 500 nm.

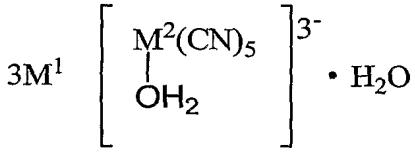
163. The method of claim 162, wherein the light comprises a wavelength of about 300 to about 360 nm.

164. The method of claim 162, wherein the light comprises a wavelength of about 450 to about 500 nm.

165. The method of claim 161, wherein the light comprises visible light or infrared light.

166. The method of claim 161, wherein the exposing occurs at a temperature from about 0°C to about 150°C.

167. A method for protecting an organic molecule from an effect of an enzyme, comprising:
allowing the organic molecule and a compound of Formula V':



V'

wherein M^1 is Li^+, Na^+, or K^+; and M^2 is Fe, Ru, or Os,
to react under conditions sufficient to make a compound of claim 154, wherein the organic molecule has:

(a) a 5-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with M;

(b) a 6-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with M;

(c) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with M;

(d) an $-NH_2$ group whose nitrogen atom forms a bond with M; or

(e) a –COOH group, one of whose oxygen atoms forms a bond with M.

168. A method for making an organic molecule bioavailable to a subject, comprising:

(a) administering a compound of claim 153 to the subject; and

(b) exposing the compound to light under conditions sufficient to release the organic molecule from the compound, wherein the organic molecule has:

(i) a 5-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with M;

(ii) a 6-membered monocyclic aromatic ring, one of the ring's members being a nitrogen atom that forms a bond with M;

(iii) an 8-10-membered bicyclic ring, one of the bicyclic rings being aromatic and having a nitrogen atom member that forms a bond with M;

(iv) an $-NH_2$ group whose nitrogen atom forms a bond with M; or

(v) a –COOH group, one of whose oxygen atoms forms a bond with M.

169. The method of claim 168, wherein the light is sunlight, photo-optic light, or laser light.

170. The method of claim 168, wherein the light is visible light or infrared light.

171. The method of claim 168, wherein the exposing occurs at the site of a tumor, cancer, or neoplasm.

172. The method of claim 168, wherein the administering occurs intravenously, topically, intradermally, intramuscularly, transdermally, subcutaneously, intranasally, parenterally,

intrathecally, vaginally, rectally, colorectally, orally, intracranially, retroorbitally, intrasternally, or by injection.

173. The method of claim 168, wherein the administering is via a transdermal patch.

174. A composition comprising a compound of claim 153 and a physiologically acceptable carrier, vehicle, diluent, or excipient.

175. A vessel containing a compound of claim 153.

176. The vessel of claim 175, further containing a biological sample.

177. The vessel of claim 176, wherein the biological sample is an organ, tissue, cell, or hair sample.

178. The vessel of claim 177, wherein the tissue is neuronal tissue.

179. The vessel of claim 177, wherein the cell is a neuronal cell.

180. The vessel of claim 177, wherein the tissue or cell is a tumor, cancer, or neoplastic tissue or cell.

181. The vessel of claim 176, wherein the biological sample is a body fluid sample.

182. The vessel of claim 181, wherein the body fluid sample is blood, serum, plasma, lymph, saliva, sputum, tears, semen, or urine.

183. A kit comprising a compound of claim 153 and instructions for use of the compound.

184. A method for assaying an organic molecule, comprising exposing a Photolabile Compound of any one of claims 1, 33, 65, 97, 128, or 153 to light under conditions sufficient to release the organic molecule from the Photolabile Compound, and (b) determining an effect of the organic molecule on a biological sample.